

EXH. A

'754 Patent and Re-Examination Certificate



US005735754A

United States Patent [19]

[11] Patent Number: 5,735,754

Antoniou

[45] Date of Patent: Apr. 7, 1998

[54] AERODYNAMIC METAL WOOD GOLF CLUB HEAD

[76] Inventor: Anthony J. Antonious, 7738 Calle Facil, Sarasota, Fla. 34238

[21] Appl. No.: 759,924

[22] Filed: Dec. 4, 1996

[51] Int. Cl.⁶ A63B 53/04

[52] U.S. Cl. 473/328; 473/345

[58] Field of Search D21/214, 215, 216, 217, 218, 219, 220; 473/327, 328, 324, 228, 286, 345, 346

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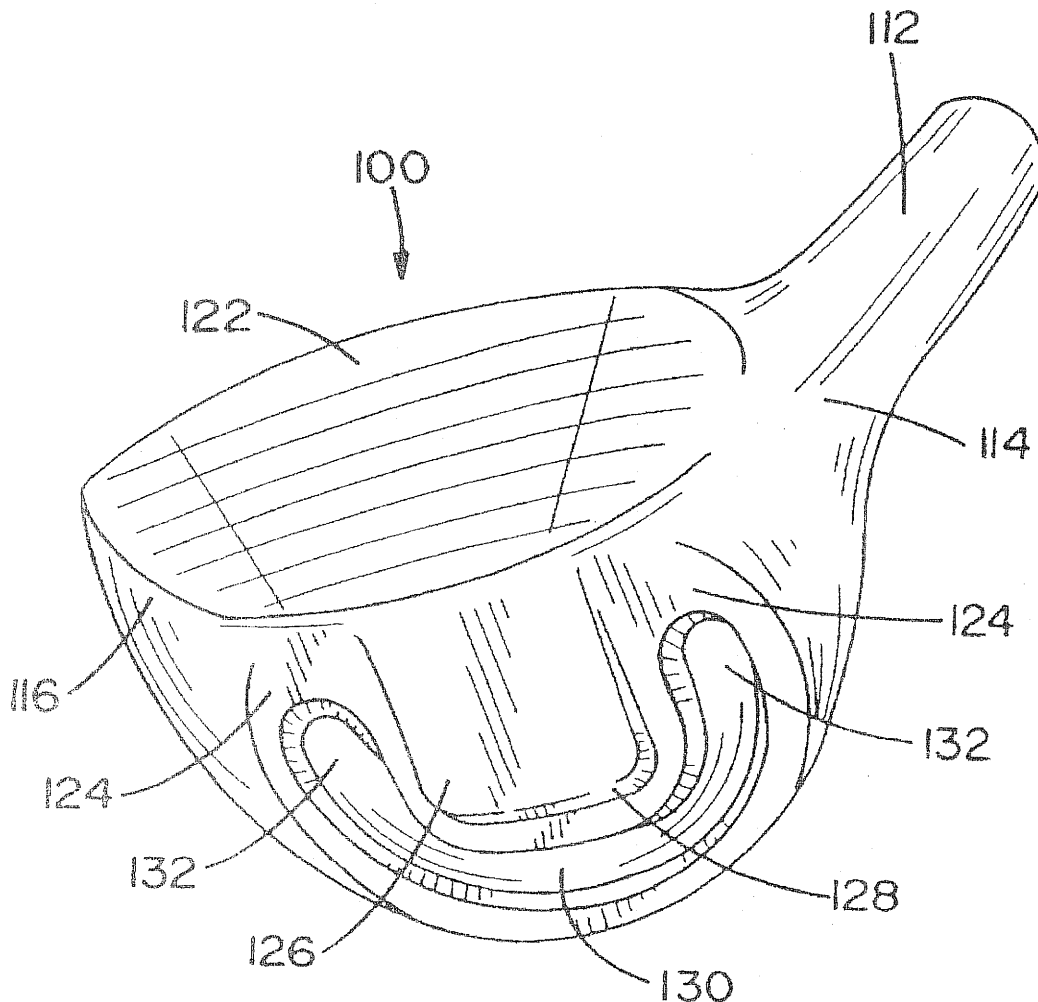
Primary Examiner—Sebastiano Passaniti

Attorney, Agent, or Firm—Aquilino & Welsh

[57] ABSTRACT

A metal wood type golf club head having a c-shaped aerodynamic configuration formed in the bottom surface adjacent a rear surface and having an open end extending forwardly toward the ball striking face in combination with a skid surface.

8 Claims, 3 Drawing Sheets



U.S. Patent

Apr. 7, 1998

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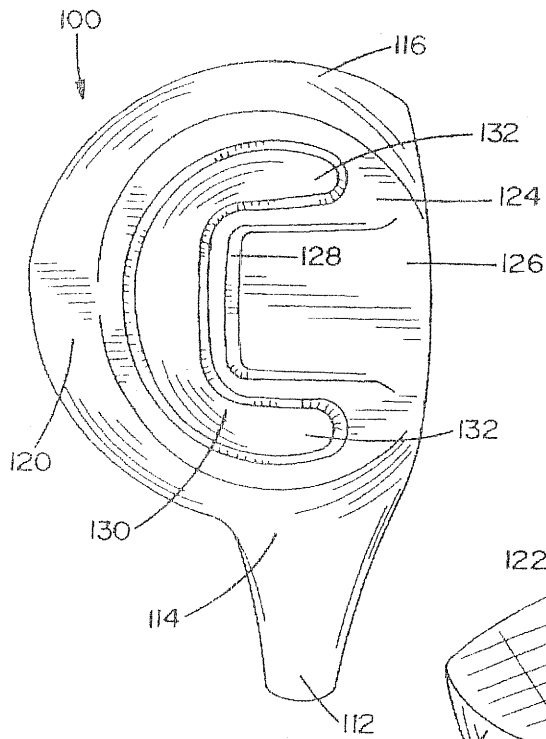


FIG. 1

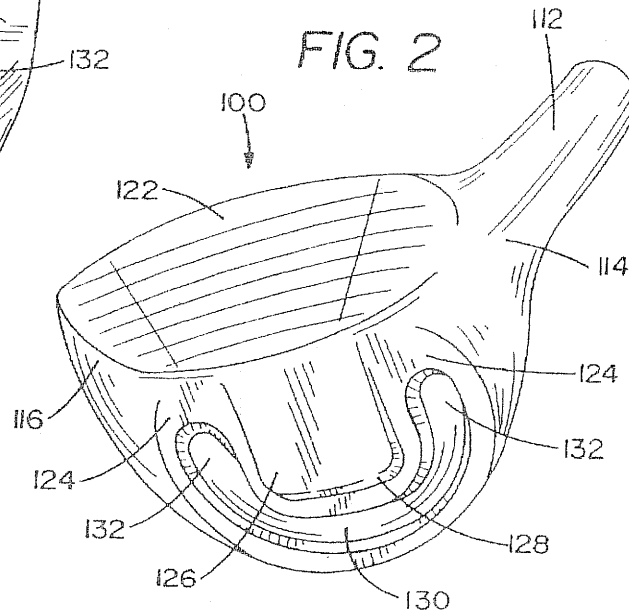


FIG. 2

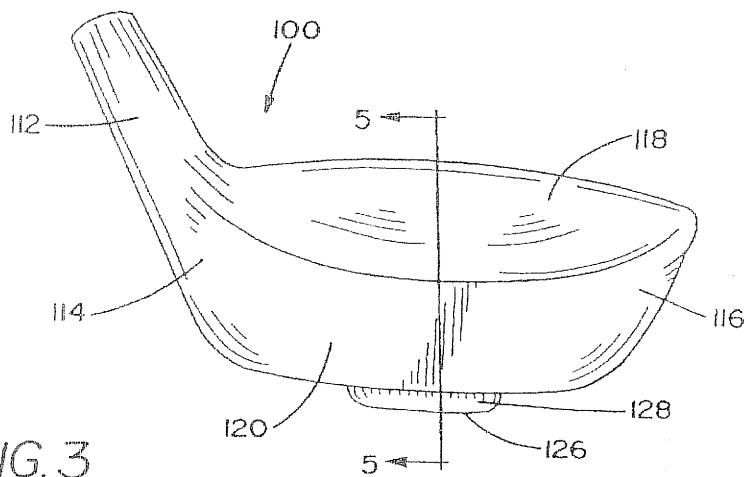


FIG. 3

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FIG. 4

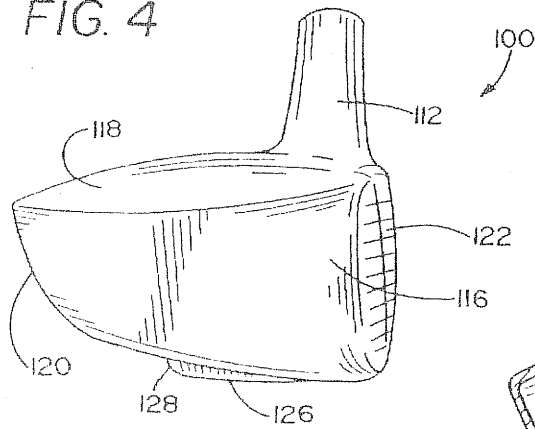


FIG. 5

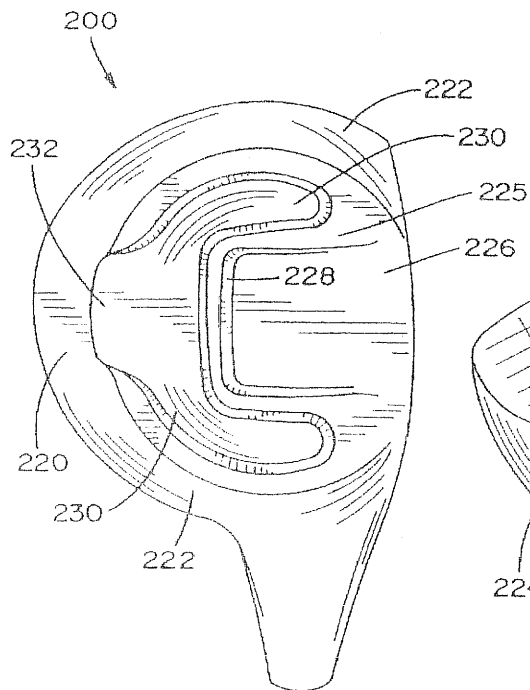
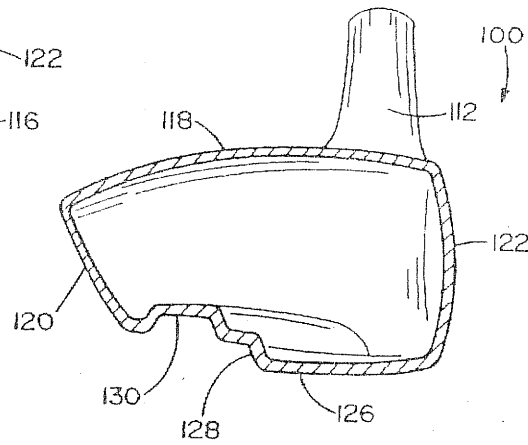


FIG. 6

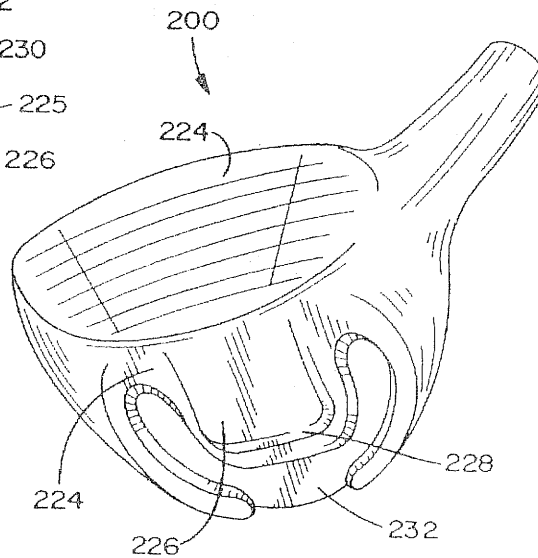


FIG. 7

FIG. 8

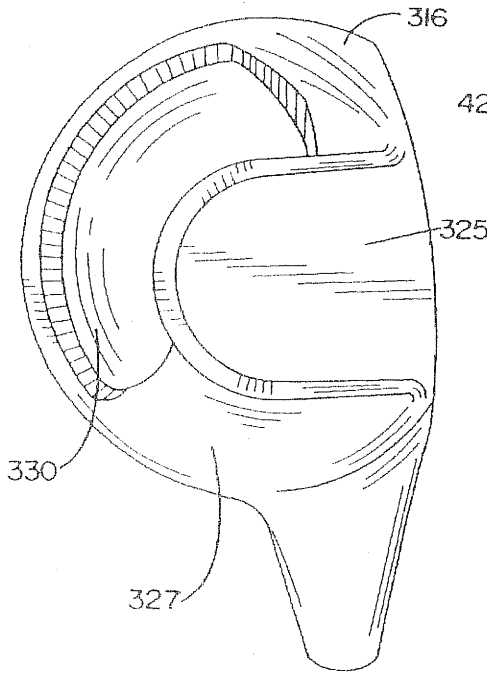
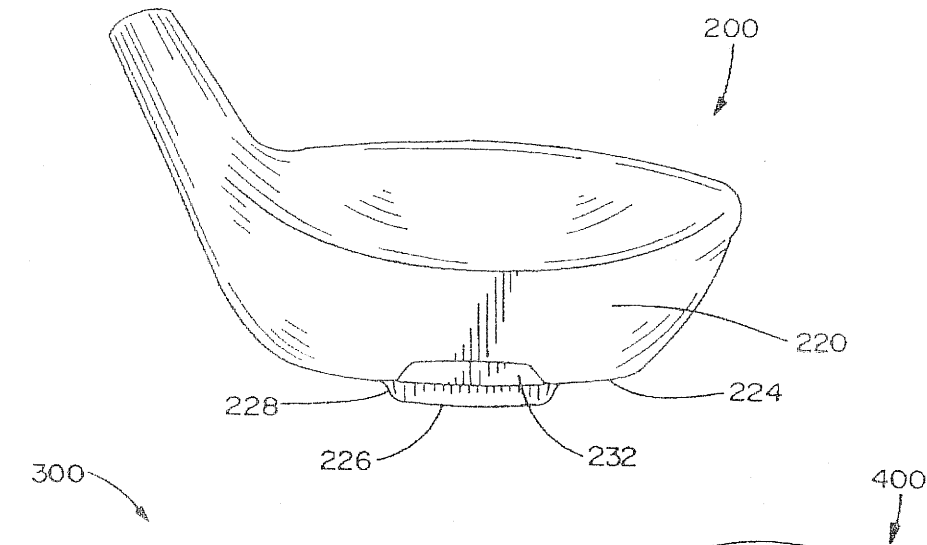


FIG. 9

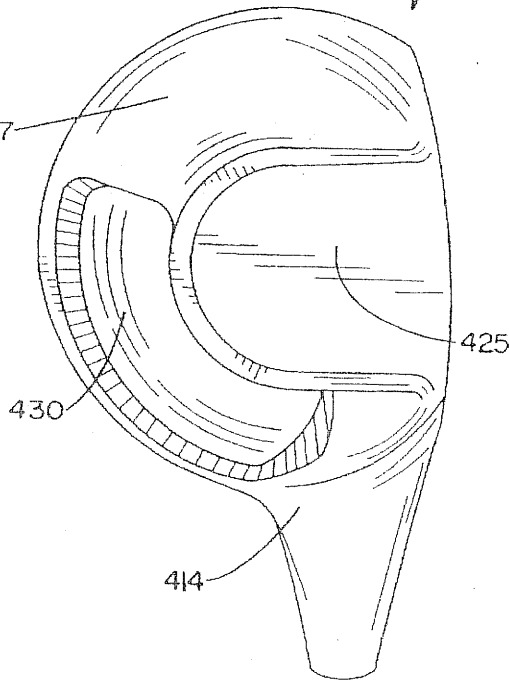


FIG. 10

5,735,754

AERODYNAMIC METAL WOOD GOLF CLUB HEAD

BACKGROUND OF THE INVENTION

The present invention relates to golf club heads and in particular to a metal wood type golf club head having an improved aerodynamic surface on the bottom rear of the sole.

Wood and metal wood type golf club heads are used for hitting a golf ball a longer distance and are usually used for the first shot of a given golf hole from a tee position. Fairway clubs of the same type are also used "through the green" on a golf hole to obtain maximum distance in the direction of or onto a putting surface. The distance the ball travels is determined by the club head speed at the moment of impact and the weight of the club head in accordance with well known laws of physics. Typical wood and metalwood golf club of this type have aerodynamic surfaces, but conventional shapes create substantial air turbulence, which, in turn, causes adverse erratic movement and aerodynamic drag that reduces the club head speed generated for a given force developed by a golfer for a particular golf swing.

Over the years, club heads have been developed with aerodynamic shapes to increase club head speed by reducing the aerodynamic drag of the club head as it is swung. Prior art examples of these type of golf club heads include U.S. Pat. Nos. D275,412 to Simmons, 2,550,840 to Milligan, 3,997,170 to Goldberg, 4,065,133 to Gordos, 4,900,029 to Sinclair, 5,203,565 to Murray et al, and 5,467,989 to Good et al. as well as my own U.S. Pat. Nos. 4,828,265, 4,930,783, 5,004,241, 5,193,810, 5,221,086 and 5,511,786 among others.

SUMMARY OF THE INVENTION

The present invention represents an improvement over known prior art wood type golf club heads by providing an aerodynamic surface on the bottom sole adjacent the rear edge of the club head, which produces greater club head speed when the club head is swung. This aerodynamic surface reduces undesirable air turbulence which causes aerodynamic drag and creates a smoother, laminar type air flow around the club head. A golf club using this improvement permits a golfer to hit longer and straighter golf shots for a given applied swing force. The aerodynamic structure also creates increased aerodynamic stability of the club head resulting in increased control of the club head position during the swing, especially at impact, thereby producing more consistent golf shots.

The golf club head of the present invention includes a c-shaped aerodynamic slot formed on the bottom sole surface of the club head. In a preferred embodiment, a metal wood type golf club head, having a smooth upper surface and sloped side walls, includes a c-shaped aerodynamic slot located adjacent the rear surface on the bottom surface or sole which generally follows the contours of the peripheral edges of the club head between the sole and the side walls. The open end of the c-shaped slot faces forwardly toward the front ball striking face of the club. The club head may also include a raised sole plate on the bottom surface having a spacer wall which also provides an aerodynamic effect and creates a skid structure enabling the club to skim across the ground surface when the club head is swung to hit a golf ball.

In another preferred embodiment, a venturi slot is provided between the c-shaped slot and the rear surface of the club head to further direct air flow adjacent the rear surface of the club head where most turbulence occurs.

The aerodynamic surfaces of the club head create aerodynamic effects which minimize turbulence and increase laminar air flow to reduce drag resulting in a more stable club head with higher speed for a given application of swing force by the golfer.

A primary object of the present invention is to provide a golf club head having an improved aerodynamic surface on the bottom sole adjacent the rear of the club head to substantially reduce drag and improve swing stability.

Another object is to provide a golf club head which increases club head speed and lift by concentrating air flow near the rear surface of the club head where turbulence occurs to reduce drag on the club head as it is swung.

Other objects and advantages of the present invention will become apparent in the following description of the preferred embodiments taken into conjunction with the accompanying drawings which are incorporated in and constitute a part of the specification and together with the description, serve to explain the principles of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a bottom view of an aerodynamic golf club head in accordance with the present invention.

FIG. 2 is a bottom perspective view of the golf club head of FIG. 1.

FIG. 3 is a rear elevational view thereof.

FIG. 4 is an end elevational view thereof.

FIG. 5 is a sectional view taken along the lines 5—5 of FIG. 3.

FIG. 6 is a bottom view of a second embodiment of an aerodynamic golf club in accordance with the present invention.

FIG. 7 is a bottom perspective view of the golf club head of FIG. 6.

FIG. 8 is rear elevational view thereof.

FIG. 9 is a bottom view of a third embodiment of the present invention.

FIG. 10 is a bottom view of a fourth embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The detailed embodiments of the present invention are disclosed herein. It should be understood, however, that the disclosed embodiments are merely exemplary of the invention, which may be embodied in various forms. Therefore, the details disclosed herein are not to be interpreted as limited, but merely as the basis for the claims and as a basis for teaching one skilled in the art how to make and/or use the invention.

FIGS. 1-5 show a first embodiment of a golf club head 100 in accordance with the present invention. The golf club head 100 is conventional in shape, except for the aerodynamic surfaces and includes a hosel 112, heel 114, toe 116, upper surface 118, rear surface 120, ball striking face 122 and bottom surface 124. The bottom sole 124 includes a skid member 126 which extends outwardly from the bottom sole 124 and is separated therefrom by a spacer wall 128. A c-shaped aerodynamic slot 130 is formed on the bottom surface 124 and faces forwardly with open ends 132 of the c-shaped slot 130 being toward the ball striking face 122. Preferably, the c-shaped slot 130 extends from a point adjacent the interface of the bottom surface 124 and rear surface 120 across approximately two thirds of the distance to the ball striking face 122.

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The aerodynamic slot 130 catches air just behind the ball striking face 122 and directs it toward the rear surface 120 within the curved walls of the c-shaped slot 130 of the club head 100. The air is expelled rearwardly out of the slot to minimize turbulence and reduce drag as the club head 100 is swung. At the same time, the skid 126 and spacer walls 128 also serve to direct the air flow rearwardly to increase laminar flow in that area of the club head 100.

FIGS. 6, 7, and 8 show a second embodiment of a golf club head 200 in accordance with the present invention. This club head 200 is similar to that described to the club head hereinabove and includes a hosel 212, heel 214, toe 216, upper surface 218, rear surface 220, upper toe 230, side walls 222, a ball striking face 224, bottom surface 225, a skid 226 and a spacer wall 228 separating the skid 226 from the bottom surface 225. A c-shaped aerodynamic slot 230 is formed on the bottom surface 225 adjacent the rear surface 220. The open end of the slot 230 faces forwardly toward the ball striking face 224.

The slot 230 is formed with a venturi opening 232 which extends rearwardly and upwardly into the rear surface 220 creating an additional air channel to direct the air flow.

FIG. 9 shows another embodiment of the present invention. A golf club head 300 is similar to the club head described in FIGS. 1-5 and includes a bottom surface 325, a side surface 327 and an aerodynamic slot 330 which is offset in the direction of the toe 316 of the club head 300.

FIG. 10 shows another embodiment similar to FIG. 9. A golf club head 400 and includes a bottom surface 425, a side surface 427 and an aerodynamic slot 430 which is offset in the direction of the heel 414 of the club head 400.

It will be appreciated that the offset aerodynamic slots of FIGS. 9 and 10 allow greater club head speed at the heel or toe selectively in order to more effectively accommodate the swing characteristics of a particular golfer, whether left-handed or right-handed.

While various preferred embodiments have been shown and described, it will be understood that there is no intent to limit the invention by such disclosure, but rather, is intended to cover all modifications and alternate constructions falling within the spirit and scope of the invention as defined in the appended claims.

I claim:

1. An aerodynamic golf club head including a club head body having a heel, toe, rear surface, ball striking face, upper surface and bottom surface, wherein the improvement comprises:

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an aerodynamic configuration on said bottom surface adjacent said rear surface in the form of a c-shaped slot having an open end facing forwardly toward said ball striking face; said aerodynamic configuration further including a skid surface formed on and raised from said bottom surface; said skid surface having a wall separating said skid surface from said bottom surface.

2. The aerodynamic golf club head of claim 1 further including a venturi opening in fluid communication with and extending rearwardly from said c-shaped aerodynamic slot toward said rear surface.

3. The aerodynamic golf club head of claim 1 wherein said slot is further defined by being offset from said heel of said club head.

4. An aerodynamic golf club head including a club head body having a heel, toe, rear surface, ball striking face, upper surface and bottom surface, wherein the improvement comprises:

an aerodynamic configuration on said bottom surface adjacent said rear surface in the form of a c-shaped slot having an open end facing forwardly toward said ball striking face; said slot being offset from a center of said bottom surface centerline passing through a longitudinal in a heel-to-toe direction.

5. The aerodynamic golf club head of claim 4 wherein said slot is offset toward said heel.

6. The aerodynamic golf club head of claim 3 wherein said slot is offset toward said toe.

7. The aerodynamic golf club of claim 1 wherein said slot is further defined by being offset from said toe of said club head.

8. An aerodynamic golf club head including a club head body having a heel, toe, rear surface, ball striking face, upper surface and bottom surface, wherein the improvement comprises:

an aerodynamic configuration on said bottom surface adjacent said rear surface in the form of a c-shaped slot having an open end facing forwardly toward said ball striking face; said aerodynamic configuration further including a venturi opening in fluid communication with and extending rearwardly from said c-shaped aerodynamic slot toward said rear surface.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 5,735,754
APPLICATION NO. : 08/759924
DATED : April 7, 1998
INVENTOR(S) : Anthony J. Antonious

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Col. 4, Line 28, Claim 6: Change "3" to --4--

Signed and Sealed this

First Day of July, 2008

A handwritten signature in black ink, appearing to read "Jon W. Dudas". The signature is stylized with a large, looped initial "J" and a cursive "Dudas".

JON W. DUDAS
Director of the United States Patent and Trademark Office



US005735754C1

(12) EX PARTE REEXAMINATION CERTIFICATE (152004)

United States Patent
Antonious

(10) Number: **US 5,735,754 C1**
(45) Certificate Issued: **Jan. 5, 2010**

(54) **AERODYNAMIC METAL WOOD GOLF CLUB HEAD**

(75) Inventor: **Anthony J. Antonious, Sarasota, FL (US)**

(73) Assignee: **Anthony J Antonious Irrevocable Trust, Wanaque, NJ (US)**

Reexamination Request:

No. 90/010,266, Sep. 2, 2008

Reexamination Certificate for:

Patent No.: **5,735,754**
Issued: **Apr. 7, 1998**
Appl. No.: **08/759,924**
Filed: **Dec. 4, 1996**

Certificate of Correction issued Jul. 1, 2008.

(51) **Int. Cl.**
A63B 53/04 (2006.01)

(52) **U.S. Cl.** **473/328; 473/345**

(58) **Field of Classification Search** **None**
See application file for complete search history.

(56) **References Cited**

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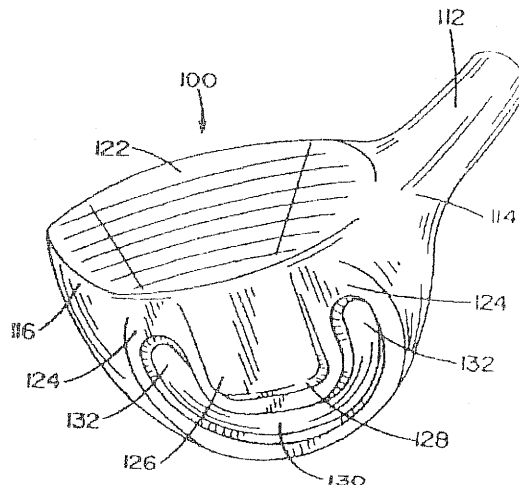
Golf Magazine, Sep. 1996, p. 70, Sizing It Up by Rob Sauerhaft.

* cited by examiner

Primary Examiner—Peter C. English

(57) **ABSTRACT**

A metal wood type golf club head having a c-shaped aerodynamic configuration formed in the bottom surface adjacent a rear surface and having an open end extending forwardly toward the ball striking face in combination with a skid surface.



US 5,735,754 C1

1
**EX PARTE
REEXAMINATION CERTIFICATE
ISSUED UNDER 35 U.S.C. 307**

THE PATENT IS HEREBY AMENDED AS
INDICATED BELOW.

Matter enclosed in heavy brackets [] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

ONLY THOSE PARAGRAPHS OF THE
SPECIFICATION AFFECTED BY AMENDMENT
ARE PRINTED HEREIN.

Column 2, lines 53-67:

FIGS. 1-5 show a first embodiment of a golf club head 100 in accordance with the present invention. The golf club head 100 is conventional in shape, except for the aerodynamic surfaces and includes a hosel 112, heel 114, toe 116, upper surface 118, rear surface 120, ball striking face 122 and bottom surface 124. The bottom sole 124 includes a skid member 126 which extends outwardly from the bottom sole 124 and is separated therefrom by a spacer wall 128. A c-shaped aerodynamic slot 130 is formed on, and substantially parallel with, the bottom surface 124 and faces forwardly with open ends 132 of the c-shaped slot 130 being toward the ball striking face 122. As shown in FIG. 1, c-shaped aerodynamic slot 130 transects a virtual centerline that passes through ball striking face 122 and rear surface 120 of the club head. Preferably, the c-shaped slot 130 extends from a point adjacent the interface of the bottom surface 124 and rear surface 120 across approximately two thirds of the distance to the ball striking face 122.

Column 3, lines 22-26:

FIG. 9 shows another embodiment of the present invention. A golf club head 300 is similar to the club head described in FIGS. 1-5 and includes a bottom surface 325, a side surface 327 and an aerodynamic slot 330 on said bottom surface which is substantially parallel with the bottom surface, and offset from a virtual centerline that passes transversely through a heel-to-toe axis of the club head, in the direction of the toe 316 of the club head 300, with a portion of slot 330 passing through the virtual centerline.

Column 3, lines 27-30:

FIG. 10 shows another embodiment similar to FIG. 9. A golf club head 400 [and] includes a bottom surface 425, a side surface 427 and an aerodynamic slot 430 on said bottom surface which is offset from a virtual centerline that passes transversely through a heel-to-toe axis of the club head, in the direction of the heel 414 of the club head 400, with a portion of slot 430 passing through the virtual centerline.

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AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim 8 is confirmed.

Claim 4 is cancelled.

Claims 1, 3, 5, 6 and 7 are determined to be patentable as amended.

Claim 2 dependent on an amended claim, is determined to be patentable.

New claim 9 is added and determined to be patentable.

1. An aerodynamic golf club head including a club head body having a heel, toe, rear surface, ball striking face, upper surface and bottom surface, wherein the improvement comprises:

an aerodynamic configuration on, and substantially parallel with, said bottom surface adjacent said rear surface in the form of a c-shaped slot having an open end facing forwardly toward said ball striking face; said aerodynamic configuration further including a skid surface formed on and raised from said bottom surface; said skid surface having a wall separating said skid surface from said bottom surface, said c-shaped slot transecting a virtual centerline passing through said ball striking face and said rear surface of said club head.

3. The aerodynamic golf club head of claim 1 wherein said slot is [further defined by being] offset from said heel of said club head.

5. The aerodynamic golf club head of claim [4] 9 wherein said slot is offset toward said heel.

6. The aerodynamic golf club head of claim [4] 9 wherein said slot is offset toward said toe.

7. The aerodynamic golf club of claim 1 wherein said slot is [further defined by being] offset from said toe of said club head.

9. An aerodynamic golf club head including a club head body having a heel, toe, rear surface, ball striking face, upper surface and bottom surface, in which the improvement comprises:

an aerodynamic configuration within, and substantially parallel to, said bottom surface, adjacent said rear surface, in the form of a c-shaped slot having an open end facing forwardly toward said ball striking face, said slot offset from, and a portion thereof passing through, a virtual centerline passing transversely through a heel-to-toe axis of said club head.

* * * * *

EXH. B

2009 Gillig Re-Examination Declaration

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

04/22/09
USPTO

APPLICANT: Anthony J. Antonious

EXAMINER: Peter English

RE-EXAM APPLICATION NO.: 90/010,266

RE-EXAM FILING DATE: 09/02/2008

PATENT NO.: 5,735,754

CONFIRMATION NO. 2019

ATTORNEY DOCKET NO. ADAM-070208.044

DECLARATION UNDER 37 CFR 1.132 IN SUPPORT OF
RE-EXAMINATION RESPONDENT/PATENTEE

I, John P. Gillig, do hereby declare and aver as follows:

1. I reside at 2823 N. Course Drive, Unit 204, Pompano Beach, Florida 33069 and am the Vice President for Research and Development of Triple Tee Golf, Inc., Pompano Beach, Florida.
2. Since approximately age 21, I have been a professional golfer and golf instructor in various areas of the country, and since about 1990 have worked out of Broward County, in south Florida.
3. I have participated in many golf tournaments including the World Long Drive Championship in which I have finished as high as seventeenth in the world.
4. During the approximately last twenty years, I have been extensively involved in the design and development of golf clubs and golf club head designs. In the



course thereof, I became aware of the work of Anthony J. Antonious, a prolific golf club inventor and developer and eventually became acquainted with him.

5. Following the passing of Antonious, several years ago, I was retained by his Trust as a consultant for the purpose of assisting in the licensing of the many patents of Antonious which were still unexpired at the time of his passing.

6. I have had occasion to review U.S. Patent No. 5,735,754 (the '754 patent) which is the subject of this re-examination.

7. I understand from counsel for the Trust of Antonious that the so-called Air Bear 1 driver golf club, manufactured and marketed by the Nicklaus Golf Company during the 1996 to 1997 period is a reference of record in this case.

8. In the course of my career as a golf club developer and designer, I had occasion to meet one Thomas Stites who, I learned, was a design and development consultant to the Nicklaus Golf Company during the 1990s. It is my understanding from Stites himself, that he was the inventor of the Air Bear 1 club. I have seen and used this club on various occasions and information in connection therewith remains in my possession. More particularly, I have attached as Exh. A herewith mechanical or shop drawings which show the Air Bear 1 club in top, sole, face, heel, and toe views. I have further attached as Exh. B herewith a pamphlet entitled "Air Bear Aerodynamic Features" which was made generally available to professionals in the golf business when this product was originally introduced. As may be noted, the illustrations, at page 4 of this pamphlet are substantially identical to those shown in the drawings of Exh. A. As such, Exhs. A and B are true, valid and complete representations of the Air Bear product as I know it existed at the time of its introduction in 1996.

9. The structures as well as the principles of operation of the Air Bear driver are set forth in the attached pamphlet of Exh. B, however I will attempt to briefly summarize the same.

10. The concept of the Air Bear was to reduce so-called airflow separation (AFS) distance because the greater the AFS, the greater the resultant drag force at the toe of the club (see Page 3 of Exh. B). This is also shown in Exh. 10 of Requestor's petition (Exh. C herewith). The Air Bear sought to minimize the width of the AFS and thereby reduce the heel-to-toe drag of the club by minimizing turbulence about the sides or periphery of the club. The Air Bear sought to accomplish this by providing a concave groove about almost the entire periphery, or sides, of the club other than the face of the club itself. This resulted in a somewhat pear-shaped geometry as is apparent from the views at the right of Exh. A and at the middle right of Page 4 of Exh. B.

11. These features are particularly recited upon the "Fact Sheet" of Page 5 of Exh. B, in which reference is made to the "aerodynamic heel-to-toe airflow channel." This, as may be seen in the illustration at the bottom right of that page refers to the concave peripheral channel mentioned above and shown in Exh. A. As such, the heel-to-toe aerodynamic channel of the Air Bear was formed within the sidewalls of the club which, as may be noted in the illustrations, possessed a very small bottom or sole plate.

12. Further, the curvature of the aerodynamic channel of the Air Bear was not parallel to either the sole plate or the crown of the club.

13. The objective of the aerodynamic channel of the Air Bear was to accelerate heel-to-toe airflow while narrowing the AFS distance. This objective could not have been accomplished if the aerodynamic channel of the Air Bear was disposed in



or upon the bottom or sole plate of the club. Page 3 of Exh. B states "Normal oversize drivers separate the relative airflow completely around the skirt of the club." The Air Bear addressed this problem by reducing the dimension of the sole plate and changing the geometry of the "skirt" to thereby reduce toe related turbulence and drag while also facilitating a greater weight of the club head. In addition, Page 5 of Exh. B indicates that the heel-to-toe aerodynamic channel of the Air Bear also enabled greater speed and ease of the golf swing. The Air Bear also purported to maximize the so-called "gear effect" for off-center ball strikes.

14. Further, as may be noted in Exh. A and on the last page of Exh. B, the horse-shoe shaped aerodynamic channel of the Air Bear permitted additional weighting to be provided and, while not precisely symmetric about a front to rear centerline of the club, was not significantly offset from the centerline. In fact, the forward ends of the Air Bear channel are nearly parallel with, and each end is the same distance from, the plane of the club face. Further, as may be noted in the reference AB #6, attached herewith as Exh. D, in Exh. B of the Long Declaration, and as I have personally observed, the heel end of the Air Bear channel tails upward, away from the face plate and toward the hosel, while the toe end of the Air Bear channel is larger and tails downward toward the face plate. As such, the channel of the Air Bear is not substantially parallel to either the sole plate or the crown of the club.

15. In distinction, the structure of all embodiments of the club taught in the Antonious '754 patent was very different. Starting with function, the objective of Antonious in the club heads shown in the '754 patent was to provide an aerodynamic structure upon the bottom surface of the club adjacent the rear edge of the club head to



produce greater club head speed. Antonious, like Stites, was also concerned with undesirable turbulence and its resultant aerodynamic drag, however, the structure and principles of operation of the club of the '754 patent bear little, if any, relationship to the structure and principles of operation of the Air Bear.

16. More particularly, Antonious sought to reduce aerodynamic drag by providing a smoother, so-called laminar type of front-to-rear airflow around the club head to enable a golfer to hit balls longer and straighter. Antonious also sought to increase aerodynamic stability of the club head to provide increased control of club head position to the golfer during club swing and to provide more consistent ball strikes and therefore launches.

17. Antonious sought to achieve the above by providing a c-shaped aerodynamic slot adjacent to the rear surface of the club and upon the bottom surface at a position generally following the contour of the club body.

18. In his '754 patent, Antonious provided for c-shaped aerodynamic slots 130, 230, 330 and 430, all having the same purpose, that is, to engage the airflow just behind the striking face of the club and to direct the same toward the rear surface of the club and within the walls of the c-shaped slot. The airflow so captured would then be expelled rearwardly out of the slot to thereby minimize turbulence and drag upon the club head which would otherwise occur in the absence of such control of the front-to-rear airflow across the bottom surface of the club. This feature is common to all embodiments of the '754 patent regardless of whether or not a venturi opening, such as opening 232 (shown in Figs. 6 and 7), was included as a part of the c-shaped slot.



19. Regarding the embodiment of Figs. 9 and 10, Antonious employed a golf club head similar in shape to the golf club head described in Figs. 1-5 of the '754 patent. (See Col. 3, Line 24.) As may be noted in Fig. 5, the aerodynamic slot 130 (which as above noted is common to all embodiments) defines a plane which is substantially parallel to both the bottom surface, or sole plate, and the crown of the club. Therein, the aerodynamic slots 330 and 430 shown in Figs. 9 and 10 occupy the same plane as the slot shown in Fig. 5, i.e., a plane substantially parallel with both the bottom and top surfaces of the club. As such, the c-shaped aerodynamic slot of Antonious is separate and apart from the sidewall surfaces 127, 227, 327 and 427 of the respective embodiments of the invention.

20. The aerodynamic slots of the embodiment of Figs. 9 and 10 differ from those of the other embodiments in that such slots occupy a greater annular dimension and are each asymmetric relative to the centerline from the front-to-rear of the club. As such, the respective slots 330 and 430 of these embodiments are substantially offset from the centerline but nonetheless at least some portion thereof transverses the front-to-rear centerline of the club.

21. As to the rationale of Antonious in regard to the embodiments of the invention which appears in Figs. 9 and 10, my understanding is that his objective was to provide a golf club having an improved aerodynamic surface on the bottom sole to substantially reduce drag and improve stability. Another objective was increase lift by concentrating air flow near the rear surface of the clubhead to further reduce the turbulence in airflow at the rear of the club, this to increased club swing speeds and improved swing stability.



22. A key design aspect of the '754 patent appears where the aerodynamic slot is substantially offset from the centerline of a club. By doing this Antonious could redirect a component of the front-to-rear airflow which he sought to accelerate, either toward the toe or heel of the clubhead. The effect of this was to increase or decrease the head speed at the toe end of the clubhead if one or the other of the embodiments of Fig. 9 or Fig. 10 were used. If club speed were decreased at the toe end, which would be the case in the embodiment of Fig. 9, the speed of the toe end of the club would thereby be equalized with the speed of the heel end, thus resulting in substantially uniform speed across the entire face of the golf club. This would be an important consideration to low handicap golfers such as myself or a higher handicap golfer who has a problem slicing the ball.

23. However, if, because of a problem associated with a particular swing characteristic, one wished to reduce head speed at the heel of the club, such as for a golfer that hooks the ball (the embodiment of Fig. 10), this could also be accomplished. Swing problem characteristics exist both with left and right handed golfers. As such, Antonious sought to accommodate the needs of each, regardless of whether or not the particular golfer was a low handicap competitor who was concerned with equalizing the slight difference in head speed that normally exists between the toe and heel of the golf club.

24. In my opinion, Antonious' objectives of minimizing front-to-rear turbulence and reduction of drag upon the club, while enhancing club speed and stability, could not have been achieved if his aerodynamic slot was located within any of the sidewalls or side surfaces of the embodiments set forth in the '754 patent or if the slot



was not substantially parallel with the bottom and crown of the club. As such, I consider the cross-sectional view of Fig. 5 to be controlling with regard to the shape and geometry of the slot that was common to all embodiments of the invention.

25. I have also reviewed Design Patent No. 350,176, entitled Wood Type Golf Club Head. Apart from the fact that the symmetric cavities thereof possess no offset or asymmetry relative to the front-to-rear centerline of the club, the salient features of this patent are a centerline barrier wall, as particularly shown in Fig. 6 of this patent, and the fact that the toe-and-heel side cavities of the club are concavely carved or formed out of the sidewalls of the club, this as is clearly shown in Figs. 4 and 5 of the '176 patent. In many respects, this sidewall curvature is similar to that of the Air Bear club discussed above. However, because of the existence of the centerline barrier, heel-to-toe airflow in the manner of the Air Bear club cannot occur.

26. As is the case with the Air Bear, the "kidney-shaped cavities" of the Antonious '176 patent are not helpful in producing the laminar airflow with which the Antonious '754 patent was concerned. In fact, the structure of the '176 design patent would be detrimental to the aerodynamics of the clubhead. Both the barrier walls in the center of the clubhead and steep walls at the sides are easily distinguishable from the interior surface of the cavities. Also, the walls form a sharp edge with the inner surface of the deep symmetric cavities. The effect is to trap air inside the cavities and to impede air from flowing freely over the steep walls which act as a barrier to air flow causing increased drag on the clubhead. It should be noted that if the walls were connected to the inner cavity by a curved fillet surface, smoother more aerodynamic airflow would result,

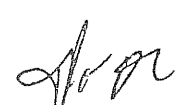


but this is not the case. Further, the '176 design patent disclose an "ornamental design for a wood type golf club" whose purpose was for aesthetics.

27. In my opinion, the only value, in terms of enhanced stability of the club of the '176 patent, would occur during the upward part of a golfer's swing, commencing shortly before ball strike and continuing through the end of the club swing.

28. I have also reviewed U.S. Design Patent 363,961 (1995) to Krzynowek et al, entitled Golf Clubs. This, like the '176 reference is also a design patent. As shown in Fig. 5 thereof, the sole cavity in the plate of the '961 patent transects an angle of about 60 degrees, does not pass through the face-to-rear centerline, does not define a c-shaped slot, and does not have ends that are directed toward the face of the club. As such, I do not see any structural or functional relationships between the '961 design patent and the '754 utility patent of Antonious. As a design patent, the intended function of small cavity of the '961 patent is unknown.

29. I have also reviewed U.S. Design Patent 372,063 (1996) to Hueber, another design patent for a golf club head, and cannot find in it any geometry which could be termed a c-shaped slot. More particularly, Fig. 7 indicates an essentially rectangular and centerline symmetric recess in the bottom of the club. As such its only apparent relationship to the '754 patent is the existence of some form of recess within the bottom of the club. This appears to be a "rail" club of a type popular in the mid-1990s in which the objective was to minimize contact between the club and the turf, upon ball strike. This is perhaps the only feature in common between the '063 design patent and the Antonious '754 patent which also had a rail feature which was elements 126, 226, 325 and 425 of the club.



30. I have also reviewed U.S. Patent No. 6,257, 991(2001) to Ortiz, entitled Metal Club Head and Drive. This patent has some similarities to the embodiment of Figs. 1-5 of the '754 patent and, in fact, the Abstract page of this patent, under "References Cited" indicates that the Examiner of the '991 patent cited to the '754 patent.

31. As may be seen in Fig. 4 of the '991 patent, this patent does not include a skid like the geometry of the embodiment of Figs. 1-5 of the '754 patent and, in lieu thereof, employs runners 52. During this period, such runners were used in golf club drivers as alternatives to skids to minimize club contact with the golf course turf. Regarding the c-shaped groove 54 of the '991 patent, this groove is symmetric relative to the front to rear centerline of the club and, as such, cannot be relevant to the embodiment of Figs. 9-10 of the '754 patent. Figs. 2 and 3 of the '991 patent show that the c-shaped groove 54 thereof was located well above the sole plate of the club, exhibited an irregular crown-to-sole axis geometry and was not parallel to the sole plate, as was the aerodynamic slot of the '754 patent.

32. I have also review U.S. Patent No. 5,456,469 (1995) to MacDougall, entitled Dynamically Stabilized Golf Club. This club teaches the provision of an E-shaped geometry as the sole plate. This geometry appears to be integrally formed with the solid body of the club itself in which so-called strakes 26 and 28 perform a function comparable to the runners 52 in the '991 patent. As may be seen in the cross-sectional view of Fig. 3 of the '469 patent, airflow is necessarily directed along the recess between the strakes 26 and 28 such that airflow in that channel is accelerated while, in the '754 patent, airflow is blocked along the centerline of the club to create an acceleration of



airflow within and along the particular aerodynamic slot along the edges of the bottom surface.

33. Further, the E-shaped recess of the '469 patent is substantially symmetric about the front-to-rear centerline of the club, this in distinction to the substantially off-center positioning of the aerodynamic slot in the embodiments of Figs. 9-10 of the '754 patent.

34. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and, further, that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of this patent or of any successor patent issued thereupon.

DATE

4/20/09

JOHN P. GILLIG

Exhibits herewith:

- A. Mechanical drawings of Air Bear Club.
- B. Brochure entitled Air Bear Aerodynamic Features.
- C. Exh. 10 of Requestor's Petition.
- D. Examiner's Reference AB #6



EXH. C

Abstracts of U.S. Patent Nos. 4,832,338; 5,810,675; and 7,717,803

United States Patent [19]

Magazzi

[11] Patent Number: **4,832,338**[45] Date of Patent: **May 23, 1989**

[54] MULTIPURPOSE GOLF GAME UTENSIL

[76] Inventor: **Michael Magazzi**, 3828 Sunney Valley Rd., New Milford, Conn. 06776

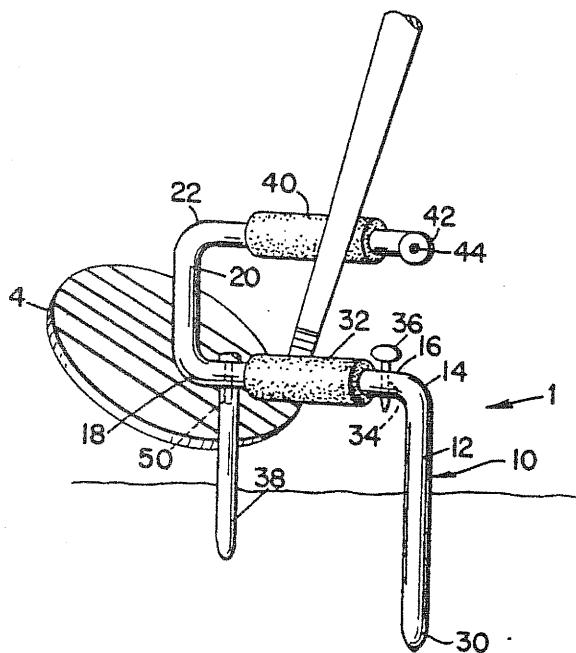
[21] Appl. No.: 166,693

[22] Filed: **Mar. 14, 1988**[51] Int. Cl.⁴ **A63B 55/10; F16M 13/00**[52] U.S. Cl. **273/32 A; 273/32 E; 273/162 R; 248/530**[58] Field of Search **273/32 R, 32 A, 32 B, 273/32 D, 32 E, 194 R, 162 R, 162 D, 162 F; 211/70.2; 206/315.2; 224/918; 248/530, 359, 359 G; D8/354; D21/223; 124/23 R**[56] **References Cited****U.S. PATENT DOCUMENTS**

3,828,757 8/1974 Finlay 124/41 A

Primary Examiner—Richard C. Pinkham*Assistant Examiner*—S. Passaniti*Attorney, Agent, or Firm*—Joseph R. Carvalko, Jr.[57] **ABSTRACT**

This invention relates to a device which serves as a stand for a golf club. In addition the device can be used to mark the location of the ball, clean the accumulation of debris from the bottom of the golfer's shoe, and clean the debris often formed on the face of a golf club. The device consists of a rod with various bends so as to lodge a golf club. The rod is covered with a frictional material to aid in the balance of the golf club. There is a first vertical member which is used to stand the device erect in the ground. Above and connected to the vertical member is a C-shaped frame which is used to support the shaft and head of a golf club when the club is not in use. The first standing member has a spiked end for facilitating the insertion of the device into the ground. The spiked end is also used to remove dirt and grass from the sole and heel of the golf shoes, as well as to scrape dirt that may be lodged in the grooves of a golf club's face.

4 Claims, 1 Drawing Sheet



US005810675A

United States Patent [19]

Weathers

[11] Patent Number: 5,810,675

[45] Date of Patent: Sep. 22, 1998

[54] GOLF PUTTING STROKE TRAINING DEVICE

[76] Inventor: Patrick A. Weathers, 1606 Tilden Ave., Fort Wayne, Ind. 46805

[21] Appl. No.: 848,098

[22] Filed: Apr. 28, 1997

[51] Int. Cl.⁶ A63B 69/36

[52] U.S. Cl. 473/236; 473/253

[58] Field of Search 473/236, 253

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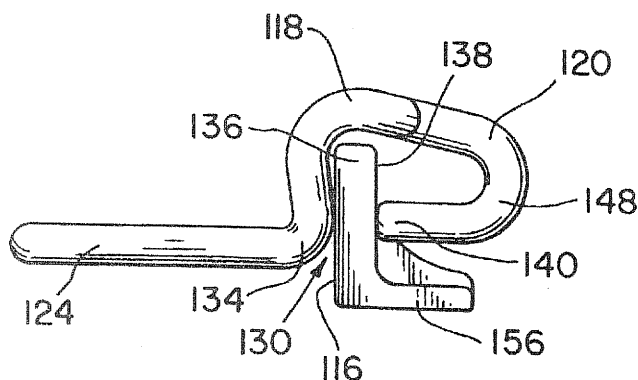
Primary Examiner—George J. Marlo

Attorney, Agent, or Firm—Baker & Daniels

[57] ABSTRACT

A putting stroke training device is removably attached to a putter in a simple one step action. A body of the training device is attached to a conventional putter and includes a C-shaped, resilient attachment member that deforms to fit over the top-line of conventional putters and, by operation of memory of the material, abuts snugly to the back face of the putter in the back cavity. Two parallel alignment guide members extend from the body perpendicularly to the face of the putter. The training device is held in place by operation of the device itself without relying upon some non-integral means for attachment. The two parallel alignment members or fingers, extending perpendicularly from the putter club face, act as a guide between which an individual strikes a golf ball. Many golfers suffer from inconsistent putting strokes in which the putter head may be angled away from the ball on the backstroke and the follow through, resulting in the golf ball leaving the face of the putter head in a direction other than toward the target. The training device of the present invention helps develop a more uniform pendulum-type putting stroke for increased accuracy and consistency in an individual's putting stroke by fostering a one-piece shoulder and arm movement. The parallel fingers provide enhanced visual alignment by "framing" the target path to help give the golfer a feel for the target path and the correct stroke path. The parallel fingers provide instant feedback to the golfer as to whether he or she is taking the putter head back parallel with the target path and whether the head stays perpendicular with the target path during the forward stroke and follow through. The parallel fingers are elevated above the ground or putting surface and the sole of the putter is unobstructed and may be rested directly against the ground or putting surface, i.e., no part of the training device of the present invention comes between the ground and the putter.

7 Claims, 3 Drawing Sheets



US007717803B2

(12) United States Patent
DiMarco**(10) Patent No.: US 7,717,803 B2**
(45) Date of Patent: *May 18, 2010**(54) C-SHAPED GOLF CLUB HEAD****(75) Inventor: Thomas J. DiMarco, Carlsbad, CA (US)****(73) Assignee: Callaway Golf Company, Carlsbad, CA (US)****(*) Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: 12/426,732**(22) Filed: Apr. 20, 2009****(65) Prior Publication Data**

US 2009/0203463 A1 Aug. 13, 2009

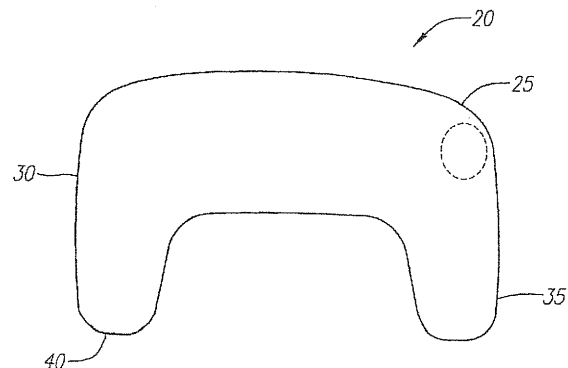
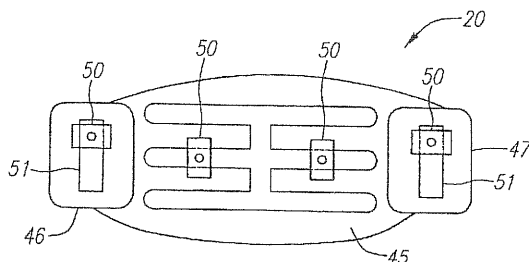
Related U.S. Application Data**(63)** Continuation of application No. 11/954,422, filed on Dec. 12, 2007, now Pat. No. 7,520,820.**(60)** Provisional application No. 60/869,697, filed on Dec. 12, 2006.**(51) Int. Cl.****A63B 53/04** (2006.01)**A63B 53/06** (2006.01)**A63B 53/08** (2006.01)**(52) U.S. Cl.** 473/334; 473/335; 473/345; 473/349; 473/350**(58) Field of Classification Search** 473/324-350, 473/287-292, 256; D21/733, 759, 734, 735
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Primary Examiner—Sebastiano Passaniti**(74) Attorney, Agent, or Firm**—Michael A. Catania; Elaine H. Lo**(57)****ABSTRACT**

A C-shaped golf club head is disclosed herein. The body has a striking plate wall, a crown section, a sole section and a rear wall. The golf club head also has a plurality of weight members positioned on the rear wall of the body. Each of the plurality of weight members is movable along the rear wall.

10 Claims, 3 Drawing Sheets

EXH. D

Complete Copy of U.S. Patent No. 6,890,267 to Mahaffey

US006890267B2

(12) **United States Patent**
Mahaffey et al.

(10) **Patent No.:** **US 6,890,267 B2**

(45) **Date of Patent:** **May 10, 2005**

(54) **GOLF CLUB HEAD WITH PERIPHERAL WEIGHTING**

(75) **Inventors:** **Steven J. Mahaffey**, Belchertown, MA (US); **Thomas M. Greene**, Monson, MA (US); **David Lowe**, Annapolis, MD (US)

(73) **Assignee:** **Callaway Golf Company**, Carlsbad, CA (US)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 49 days.

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(21) **Appl. No.:** **10/798,147**

(22) **Filed:** **Mar. 11, 2004**

(65) **Prior Publication Data**

US 2004/0176177 A1 Sep. 9, 2004

Related U.S. Application Data

(62) Division of application No. 10/379,146, filed on Mar. 4, 2003.

(60) Provisional application No. 10/389,347, filed on Jun. 17, 2002.

(51) **Int. Cl.⁷** **A63B 53/04**

(52) **U.S. Cl.** **473/256; 473/328; 473/334**

(58) **Field of Search** **473/334, 335, 473/336, 337, 338, 339, 341, 345, 349**

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Primary Examiner—Gregory Vidovich

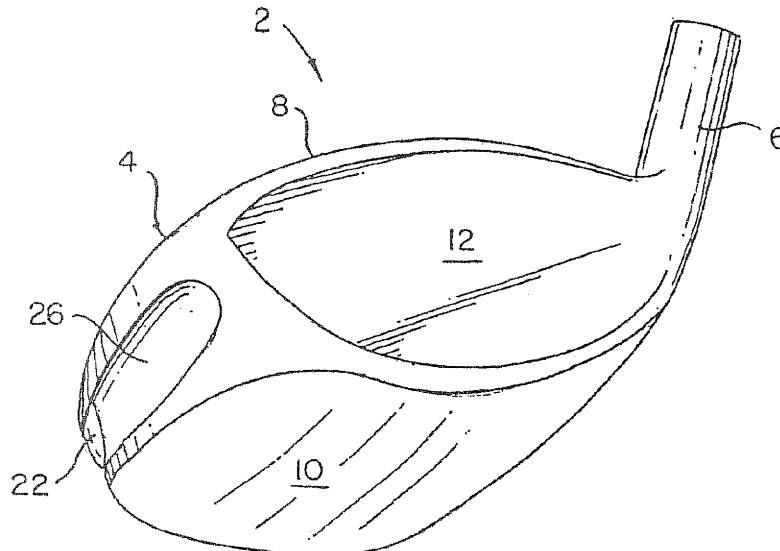
Assistant Examiner—Nini F. Legesse

(74) *Attorney, Agent, or Firm*—Michael A. Catania; Elaine H. Lo; Lawrence E. Laubscher, Jr.

(57) **ABSTRACT**

A golf club head with low peripheral and rearward weighting includes C-shaped and annular weights connected with at least one of the rear and bottom surfaces, respectively, of the head. The weighting within the peripheral weights is adjustable between the heel, rear, and toe portions of the head to customize the weight distribution of the head in accordance with a golfer's swing. The added weight and its orientation increases the moment of inertia of the head and reduces the rotation thereof.

2 Claims, 3 Drawing Sheets



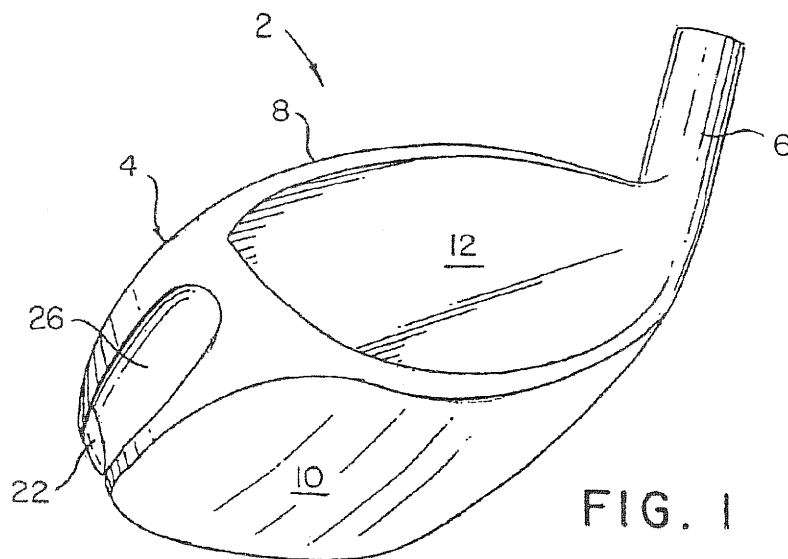


FIG. 1

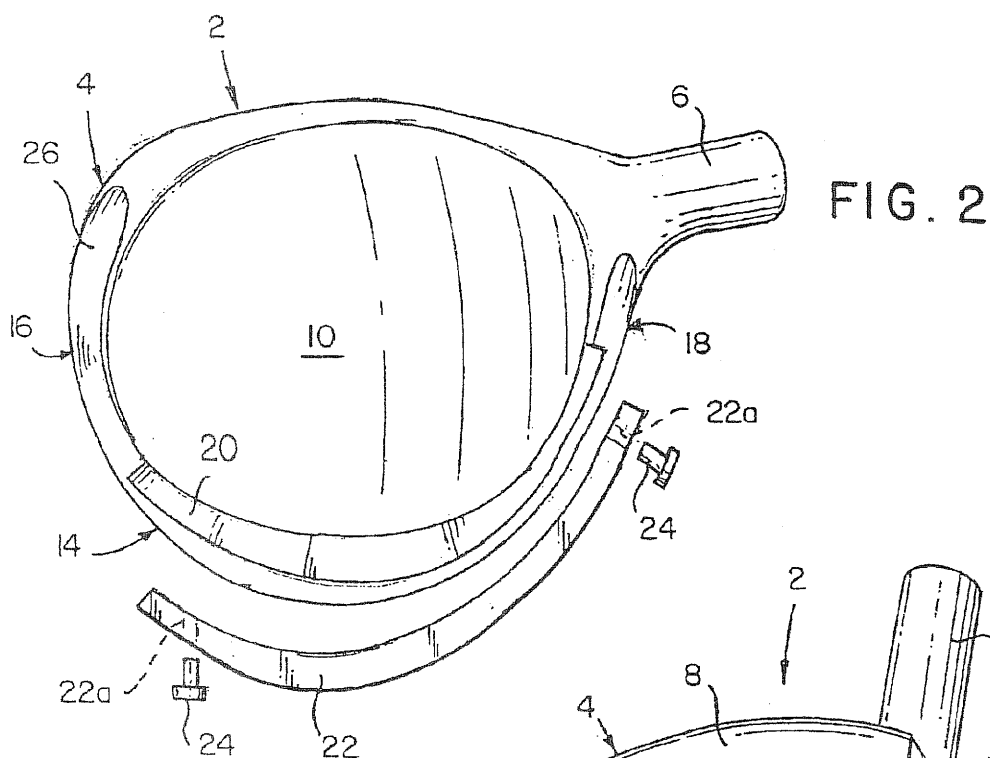


FIG. 2

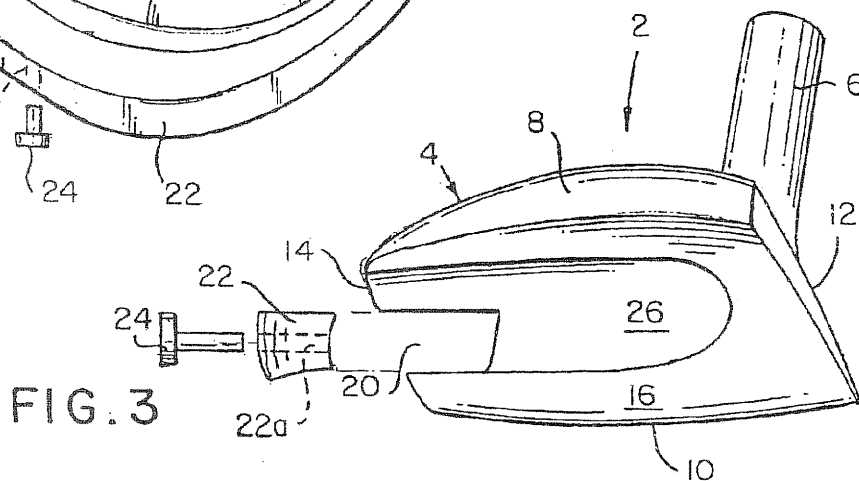


FIG. 3

U.S. Patent

May 10, 2005

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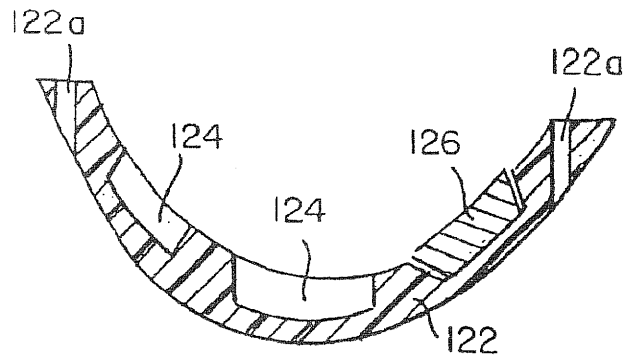


FIG. 4A

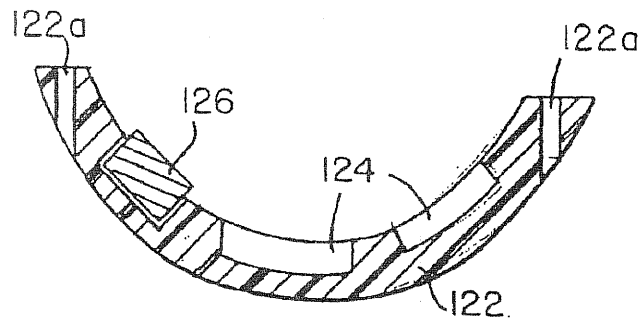


FIG. 4B

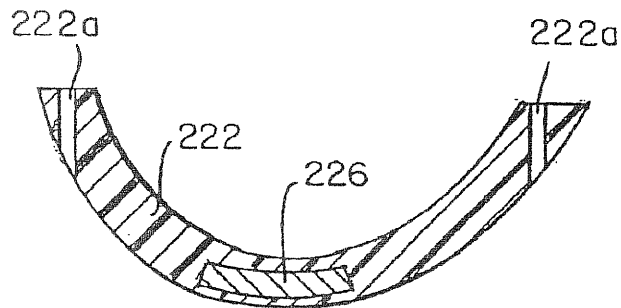


FIG. 5

U.S. Patent

May 10, 2005

Sheet 3 of 3

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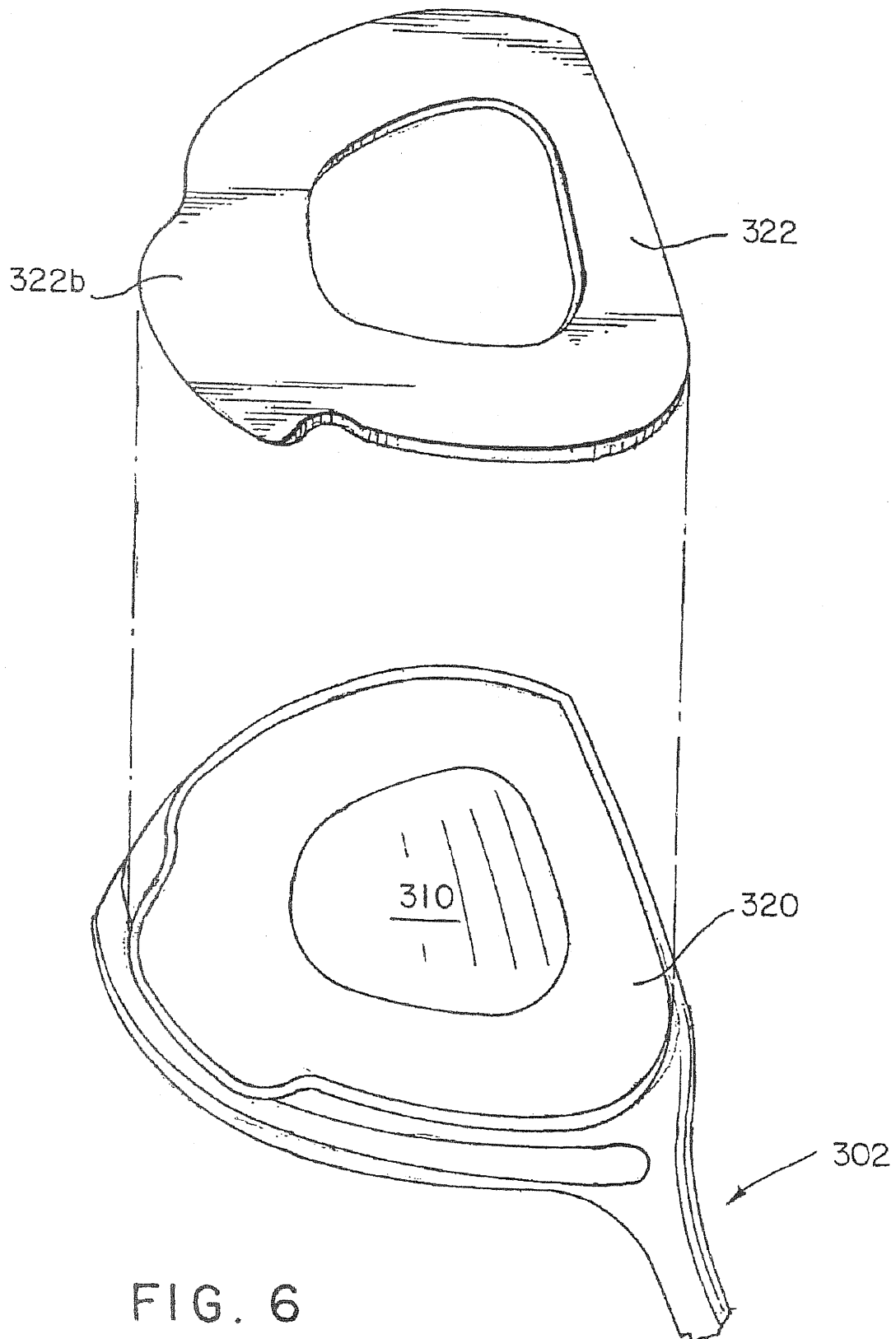


FIG. 6

US 6,890,267 B2

1

GOLF CLUB HEAD WITH PERIPHERAL WEIGHTING

This application is a division of U.S. patent application Ser. No. 10/379,146 filed Mar. 4, 2003 which claims the benefit of U.S. provisional application No. 60/389,347 filed Jun. 17, 2002.

BACKGROUND OF THE INVENTION

The boon of the amateur golfer is mis-hit shots resulting from striking a golf ball outside of the central area or sweet spot of the club face. In order to compensate for such shots, golf clubs have been developed which include perimeter weighting. That is, weight in the club head is re-distributed around the perimeter of the striking face in order to enlarge the sweet spot of the face.

While perimeter weighting is particularly useful in iron-type golf club heads, wood heads present additional difficulties to the amateur golfer because of the enlarged body behind the striking face. Such heads generally produce a lower trajectory and more side spin on a ball, both of which decrease the length and accuracy of the shot.

The present invention relates to an improved wood-type golf club head with adjustable weighting around the rear periphery of the head and increased weighting toward the sole of the club. Low rearward weighting increases the launch angle and reduces the spin rate of a struck golf ball. Peripheral weighting generally increases the moment of inertia and the resistance to rotation of the club head.

BRIEF DESCRIPTION OF THE PRIOR ART

Peripheral weights for golf club irons are known in the patented prior art as evidenced by the Kobayashi et al. U.S. Pat. No. 5,613,917. Similarly, peripheral weights for putters are known as shown by the Schaeffer et al. U.S. Pat. No. U.S. Pat. No. 5,676,606. Lastly, peripheral weights for woods are shown in the Galy U.S. Pat. No. 5,720,674, Aizawa U.S. Pat. No. 5,207,428, Galy U.S. Pat. No. 5,971,867, and Galy U.S. Pat. No. 6,217,461.

While the prior devices operate satisfactorily, most of the peripherally weighted woods are limited by the fact that the weight distribution cannot be altered to customize the club to the needs of a particular golfer. The present invention was developed in order to overcome these and other drawbacks of the prior clubs by providing a wood-type golf club head with adjustable peripheral weighting and low rearward weighting to improve the performance of the club.

SUMMARY OF THE INVENTION

Accordingly, the present invention relates to a golf club head of the wood-type having a metal body with upper and lower surfaces, a ball striking face, a curved rear surface, and toe and heel surfaces between the striking face and the rear surface. A peripheral weight is connected with the body on at least one of the rear and lower surfaces in order to increase the moment of inertia of the club head.

According to a preferred embodiment, the rear surface of the club head contains an elongated recess within which a C-shaped peripheral weight is removably connected. The peripheral weight is preferably formed of a synthetic plastic housing within which weight members are arranged. The weight members can be integrally molded into the housing at specific locations along the length of the housing to provide a variable weight distribution. When the housing is connected with the club head, the weight member provides

2

more weight in the head at the specific location which may be arranged more toward the toe, rear, or heel of the club head.

Alternatively, the housing contains a plurality of chambers adapted to receive the weight members. The chambers are arranged along the length of the housing so that the weight members can be placed in the desired chamber by the golfer prior to connecting the housing to the club head so that once assembled, the selected weight distribution is provided in the club head.

In another embodiment, the peripheral weight has an annular configuration and is connected within an annular slot in the bottom surface of the head. Additional weight can be provided at the rear and extending upwardly toward the upper surface. Moreover, the weight distribution in the annular weight can be tailored to provide more weight toward the toe, heel, or rear of the club head.

BRIEF DESCRIPTION OF THE FIGURES

Other objects and advantages of the invention will become apparent from a study of the following specification when viewed in light of the accompanying drawing, in which:

FIG. 1 is a perspective view of the wood-type golf club head according to a first embodiment;

FIGS. 2 and 3 are exploded bottom and end views, respectively, of the club head of FIG. 1;

FIGS. 4A and 4B are cross-sectional views of a peripheral weight for the club head of FIG. 1;

FIG. 5 is a cross-sectional view of an alternate peripheral weight for the club head of FIG. 1; and

FIG. 6 is an exploded bottom perspective view of a wood-type golf club head according to a second embodiment of the invention.

DETAILED DESCRIPTION

FIGS. 1-3 show the preferred embodiment of the golf club head with a peripheral weight according to the invention. The club head 2 is of the wood type, and is preferably a metal wood including a body 4 and hosel 6. The body includes an upper surface 8, a lower surface 10 which defines the sole of the club, a ball striking face 12 and a curved rear surface 14. Between the striking face 12 and the rear surface 14 are a toe surface 16 and a heel surface 18. The head is formed in a conventional manner, preferably by welding components together as is known in the art.

The rear surface 14 contains an elongated recess 20 which extends between the toe and heel surfaces as best shown in FIG. 2. The slot is adapted to receive a C-shaped peripheral weight 22. Preferably, the weight 22 is removably connected with the body 4 by suitable fasteners such as screws 24 which pass through openings 22a in the weight and into aligned threaded openings (not shown) in the body. Alternatively, the weight 22 can be permanently secured within the recess by welding, adhesive, or the like.

The weight 22 can have a uniform weight distribution or it can have a variable distribution so that when it is connected with the head, more weight can be provided in a particular region of the head, either rearwardly or more toward the toe or heel portion as desired. For permanent installations, the weight can be formed of any material such as metal or fiber reinforced plastic.

The golf club head further includes a concave slot 26 which extends from the toe to the heel area of the club head.

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The slot extends beyond the recess and the recess is contained within the slot as shown in FIGS. 2 and 3. The slot improves the aerodynamic properties of the club head because it reduces air resistance during a golf swing. The slot results in a larger striking face area relative to the overall frontal area of the head without reducing the size of the sole.

In FIGS. 4A and 4B, there is shown a preferred C-shaped peripheral weight. The weight comprises a housing 122 preferably formed of synthetic plastic material which contains a plurality of chambers 124 in the inner concave surface thereof. Each chamber is designed to receive a weight member 126. As with the weight 22 in the embodiment of FIGS. 1-3, the housing includes through openings 122a for receiving screws (not shown) for removably connecting the housing 122 with a club head.

When the housing 122 is disconnected from the club head, the golfer may position the weight member 126 in a selected chamber to provide more weight in a selected area of a club head. For example, when the weight is positioned in the chamber as shown in FIG. 4A and the housing is connected with a head oriented as shown in FIG. 2, more weight will be provided rearwardly and toward the heel end of the club head. If the weight is positioned as shown in FIG. 4B, more weight will be provided rearwardly and toward the toe end of the club head.

Although only a single weight member is shown in the drawing, weight members can be positioned in more than one chamber as desired. The weight members can be arranged as part of a package with different weighting for the members to enable a golfer to customize the weight distribution in the head.

FIG. 5 illustrates a further embodiment for a C-shaped peripheral weight having a synthetic plastic housing 222 including through openings 222a for connecting the weights with a club head in the same manner as discussed above. In this embodiment, a weight member 226 is molded within the housing 222 in a desired location. The weight can be part of a package with weight members molded in different locations so that different peripheral weights with different weight distributions can be connected with the club head to customize the weight distribution in the head.

FIG. 6 shows a club head 302 with a peripheral weight 322 which is connected with the lower surface or sole 310 of the head. The sole contains an annular recess 320 for receiving the weight 322 which also has an annular configuration. Unlike the weight 22 in the first embodiment of FIGS. 1-3 which provides weight around the rear portion of the head, the annular weight 322 provides weight around the bottom circumference of the head. Increased weight at the bottom of the head provides a higher trajectory to a ball struck by the club. Peripheral weighting increases the moment of inertia and the resistance to rotation of the club, particularly when a ball is struck outside the center of the striking face.

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In order to provide more weight toward the rear of the club, the annular weight 322 includes a portion 322b which extends upwardly over the rear surface of the club to reduce the spin rate of a golf ball struck by the club.

The weight 322 is secured within the club head recess 320 by welding or by an adhesive. For a removable connection, the weight can be screwed onto the club head in a known manner.

The annular weight 322 can be provided with a uniform weight distribution or with a variable weight distribution depending upon the desired weighting of the head. Thus, differently weighted annular weights can be substituted on the head to satisfy a golfer's preference. The annular weight can be formed of metal, synthetic plastic, fiber reinforced synthetic plastic or other suitable materials.

The head 302 may also be provided with an elongated concave slot 326 extending between the heel and the toe portions to increase the aerodynamic properties of the head.

It will be appreciated by those of ordinary skill in the art that a club head can also be provided which includes both the rearward C-shaped peripheral weight 22 of FIGS. 1-3 and the annular peripheral weight 322 of FIG. 6. Any combination or orientation of peripheral weighting can be achieved to satisfy the desires of the golfer to match the club head with the golfer's swing.

While the preferred forms and embodiments of the invention have been illustrated and described, it will be apparent to those of ordinary skill in the art, that various changes and modifications may be made without deviating from the inventive concepts set forth above.

What is claimed is:

1. A golf club head of the wood type, comprising:
 - (a) a metal body including an upper surface, a lower surface, a front ball striking face, a curved rear surface and toe and heel surfaces between said striking face and said curved rear surface; and
 - (b) a peripheral weight connected with said body on at least one of said rear and lower surfaces in order to increase the moment of inertia of the club head when used to strike a golf ball, said peripheral weight having an annular configuration and being connected with said body lower surface in order to lower the center of gravity of the club head, said peripheral weight including an upwardly extending portion at the rear thereof which extends upwardly over a portion of said body rear surface to distribute more weight to the rear of the club head, and wherein weight is evenly distributed throughout said peripheral weight.
2. A golf club head as defined in claim 1, wherein at least one of said toe and heel surfaces contains a concave slot for improving the aerodynamic qualities of the head.

* * * * *

CERTIFICATE OF SERVICE

On November 5, 2012, the undersigned does hereby certify that a true and correct copy of the foregoing PLAINTIFF'S OPENING MARKMAN BRIEF UNDER LOC. PAT. R. 4.5(a) was served on counsels for Defendant and Plaintiff, identified below, via Electronic Mail pursuant to agreement of the parties.

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